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## Introduction

It's far from simple for researchers to locate, comprehend and use data produced by others. This is where Tiffany can help. Tiffany enables a researcher to put their research into context by documenting and relating experiments, research questions, datasets, publications etc. However, the individual datasets themselves are still stored in arbitrary formats. These datasets typically come from a diversity of locations and disciplines. Relating data from different sources is hard for humans and even harder for computers. As a consequence, an enormous potential for discovering new knowledge is wasted. This knowledge can be unlocked with the help of semantics.

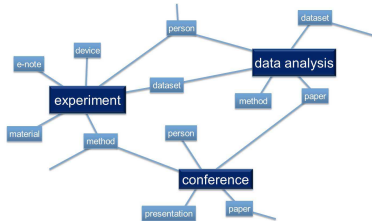


FIGURE 1: CONNECTED RESEARCH IN TIFFANY

## Tiffany

Tiffany is based on a flexible model of the research workflow. Figure 1 shows how it connects different research items such as a dataset or a method to an experiment. A dataset can also be the input for a data analysis activity, which results in a publication. In this way the link between the publication and the underlying data is maintained.

## e-Labnotes

For centuries researchers conducting experiments have documented their work in lab notebooks. With the

advent of laptops and tablet PCs these notes are increasingly being entered electronically. Tiffany includes an 'add-in' for Word which allows such notes to be quickly and easily uploaded to Tiffany, where they are safely stored and easily searchable.

## Linking data

To link data from various sources they need to be properly structured and annotated in a clear, understandable fashion.

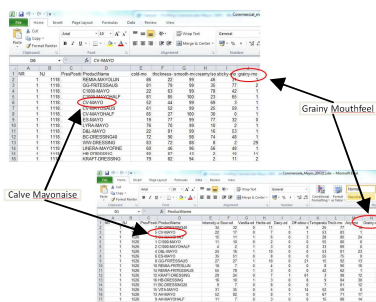


FIGURE 2: LINKING DATA IN TIFFANY

Figure 2 shows two datasets containing the same attributes. To link these attributes a shared vocabulary is needed. The Semantic Web facilitates this. It allows researchers to link parameters, variables and objects to a unique reference on the web using hyperlinks. In this way, the datasets can be related automatically.

## Rosanne

To put Linked Data into practice, we have developed Rosanne, an add-in for Excel with which data can be annotated. Figure 3 shows a view of Rosanne. The annotations are embedded in the Excel format and appear every time you open your Excel file. The data can still be edited

when the connection to Tiffany is unavailable; existing annotations are preserved.

## eFoodLab

Rosanne is one of the deliverables of the eFoodLab project. Other examples are automated annotation of data, semantic search and reasoning support. With this project TI Food and Nutrition participates in the COMMIT consortium, the largest combined effort in the area of information and knowledge technology in the Netherlands.

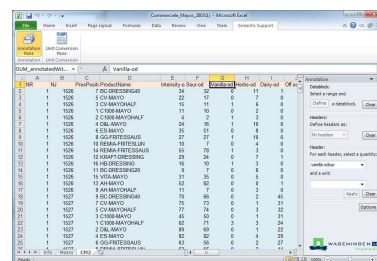


FIGURE 3: ROSANNE

## CONCLUSIONS

- Adding structure and semantics to scientific output improves effectiveness and collaboration in research.
- Shared vocabularies and tools to use and maintain them are now becoming widely available.
- Augmenting Tiffany with a semantic extension of Excel opens the door to advanced research support in practice:
- Finding related research output
- Integrating data from heterogeneous sources
- Automatic processing of data